DEFINE PROBLEM
Determining Customer Needs
Setting Product Requirements

Please sit with your team

Ref: Chap. 4, Ulrich & Eppinger text
Ref: Chap. 5, Ulrich & Eppinger text
DETERMINING CUSTOMER NEEDS

As practiced in ME 4054

(Ref: Chap. 4, Ulrich & Eppinger text)
Some ways to determine needs…

• My advisor said, “Do it this way”

• Marketing said, “Here are the specs”

• Team member Sam said, “Gosh, I would buy one!”
Another way to determine needs...

- Determine who the customers are
- Determine what information should be gathered from customers
- Determine how that information should be gathered

And then, translate that information into product requirements and engineering specifications

Within teams, list main customers
Suggestion for today’s group meeting

• Refine your customer list
• Prioritize your list
Gathering Customer Information

- Depth interviews of potential customers
- Surveys
- "On the job" observations
- Focus groups

Gather and report raw data, no interpretations….yet!
Depth interviews

- Great for getting lots of info quickly
- Can go into the “why”
- Have an interview script…clear with team and with advisor
- Take notes…of everything, not just what you want to hear…record direct quotes
- Can be difficult to schedule
- Be mindful of people’s time; ask for a specific amount of time and stick to it
- Do over telephone or in person
Surveys

• Difficult to create a good questionnaire
• Keep it short
• Minimize essay questions (interview instead)
• Need large N for quantitative data
• Screen respondents…you want the right sample
• Mail surveys…time scale wrong for ME4054
• Web surveys…only if you direct people to it
Observations

- GREAT method!
- Be a “fly on the wall”
- Observe environment where design will be used
- Take notes
- Best way to understand the user
- Important for engineers to observe…and not simply rely on what others say
Focus groups

- Generates group discussion
- Can resolve conflicting views
- More than just getting people together
- Needs a skilled moderator
- Sometimes done in special facility with 1-way mirror and design team watching
- Requires planning, scheduling
- Logistics challenging for 4054 project
What to do with the information…

• Collect information as raw data, do not interpret as you take notes
• See text for some great methods to organize and translate raw data into info you can use to design your product
• Always check info against your common sense
Example: Design of a Cordless Screwdriver

Steps:
1. Gather data from customers
2. Translate into “needs”
3. Organize into a hierarchy
4. Establish relative importance
Step 1: Gathering Raw Data from Customers

- Interviews
- Surveys
- Focus groups
- Observing the product in use
Step 2: Translating Information into Customer Needs

<table>
<thead>
<tr>
<th>Question/Prompt</th>
<th>Customer Statement</th>
<th>Interpreted Need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical uses</td>
<td>I need to drive screws fast, faster than by hand.</td>
<td>The SD drives screws faster than by hand.</td>
</tr>
<tr>
<td></td>
<td>I sometimes do duct work; use sheet metal screws.</td>
<td>The SD drives sheet metal screws into metal duct work.</td>
</tr>
<tr>
<td></td>
<td>A lot of electrical; switch covers, outlets, fans, kitchen appliances.</td>
<td>The SD can be used for screws on electrical devices.</td>
</tr>
<tr>
<td>Likes—current tool</td>
<td>I like the pistol grip; it feels the best.</td>
<td>The SD is comfortable to grip.</td>
</tr>
<tr>
<td></td>
<td>I like the magnetized tip.</td>
<td>The SD tip retains the screw before it is driven.</td>
</tr>
<tr>
<td>Dislikes—current tool</td>
<td>I don’t like it when the tip slips off the screw.</td>
<td>The SD tip remains aligned with the screw head without slipping.</td>
</tr>
<tr>
<td></td>
<td>I would like to be able to lock it so I can use it with a dead battery.</td>
<td>The user can apply torque manually to the SD to drive a screw. (I)</td>
</tr>
<tr>
<td></td>
<td>Can’t drive screws into hard wood.</td>
<td>The SD can drive screws into hard wood.</td>
</tr>
<tr>
<td></td>
<td>Sometimes I strip tough screws.</td>
<td>The SD does not strip screw heads.</td>
</tr>
<tr>
<td>Suggested improvements</td>
<td>An attachment to allow me to reach down</td>
<td>The SD can access screws at the end of down Brown tools.</td>
</tr>
</tbody>
</table>
## Step 3: Organize into a Hierarchy

## Step 4: Establish Importance

<table>
<thead>
<tr>
<th>#</th>
<th>Need</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maintains power for several hours of use</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>The SD fits into a toolbox</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>The SD works with a variety of screws</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>The SD makes a pleasant sound when in use</td>
<td>3</td>
</tr>
</tbody>
</table>

Eliminate redundant needs
Establish importance 1-5 (critical)
Step 4: Establish the relative importance of needs

- Two basic approaches
  - Consensus of team
  - Further customer survey

- A numerical ranking process is a common tool. For example:
  1. The feature is undesirable
  2. The feature is not important
  3. The feature would be nice to have, but is not necessary
  4. The feature is highly desirable
  5. The feature is critical
Reflect on the results and the process

• Have we included all of the important types of customers?
• Did we miss anything in our information gathering process? Any follow up interviews needed?
• What do we know now that we didn’t know when we started? Any surprises?
• How can we improve the process?
The bottom line...

It makes no sense to create a design that nobody other than the design team wants!

Gathering “voice of the customer” is a continuous process